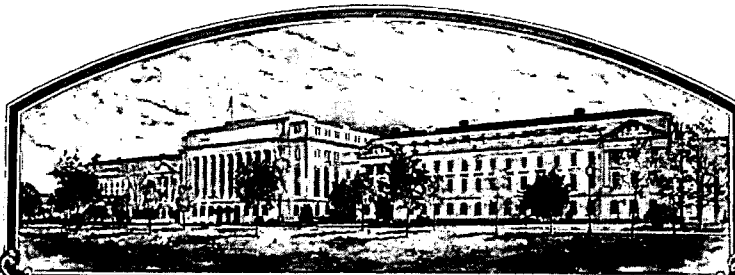


No.



201500229

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Pioneer Hi-Bred Internationa, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

An application requesting a certificate of protection for an alleged distinct variety of sexually reproduced, or tuber propagated plant, the name and description of which are contained in the application and exhibits, a copy of which is hereunto annexed and made a part hereof, and the various requirements of law in such cases made and provided have been complied with, and the title thereto is, from the records of the PLANT VARIETY PROTECTION OFFICE, in the applicant(s) indicated in the said copy, and whereas, upon due examination made, the said applicant(s) is (are) adjudged to be entitled to a certificate of plant variety protection under the law.

Now, therefore, this certificate of plant variety protection is to grant unto the said applicant(s) and the successors, heirs or assigns of the said applicant(s) for the term of TWENTY years from the date of this grant, subject to the payment of the required fees and periodic replenishment of viable basic seed of the variety in a public repository as provided by law, the right to exclude others from selling the variety, or offering it for sale, or reproducing it, or importing it, or exporting it, or conditioning it for propagation, or stocking it for any of the above purposes, or using it in producing a hybrid or different variety there from, to the extent provided by the PLANT VARIETY PROTECTION ACT. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)



CORN, FIELD

'PHIMJ9'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this twelfth day of May, in the year two thousand and sixteen.*

Attest:

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

| | | | |
|---|--|--|--|
| U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE <i>(Instructions and information collection burden statement on reverse)</i> | | <i>The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.</i> <i>Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).</i> | |
| 1. NAME OF OWNER Pioneer Hi-Bred International, Inc. | | 2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME | |
| 4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country) 7100 NW 62nd Avenue P.O. Box 1014 Johnston, Iowa 50131-1014 | | 3. VARIETY NAME PH1MJ9 | |
| 7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (corporation, partnership, association, etc.) Corporation | | 5. TELEPHONE (include area code) (515) 535-3419 6. FAX (include area code) (515) 535-2125 | |
| 8. IF INCORPORATED, GIVE STATE OF INCORPORATION Iowa | | 9. DATE OF INCORPORATION March 5, 1999 | |
| 10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. (First person listed will receive all papers) Benjamin B. Drake 7301 NW 62nd Avenue P.O. Box 85 Johnston, Iowa 50131-0085 | | 11. TELEPHONE (Include area code) (515) 535-3419 12. FAX (Include area code) (515) 535-2125 | |
| 13. E-MAIL ben.drake@pioneer.com; PVP@pioneer.com; | | FILING AND EXAMINATION FEES: \$ 4382.00 3/17/2015 DATE CERTIFICATION FEE: \$ DATE | |
| 14. CROP KIND (Common Name) Corn | | 15. GENUS AND SPECIES NAME OF CROP Zea mays | |
| 16. FAMILY NAME (Botanical) Gramineae | | 17. IS THE VARIETY A FIRST GENERATION HYBRID? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO | |
| 18. DOES THE VARIETY CONTAIN ANY TRANSGENES? <input type="checkbox"/> YES <input type="checkbox"/> NO IF YES, PLEASE GIVE THE ASSIGNED USDA-APHIS REFERENCE NUMBER FOR THE APPROVED PETITION TO DEREGULATE THE GENETICALLY MODIFIED PLANT FOR COMMERCIALIZATION. | | 20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD ONLY AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act) <input type="checkbox"/> YES (if "yes", answer items 21 and 22 below) <input checked="" type="checkbox"/> NO (if "no", go to item 23) <input type="checkbox"/> UNDECIDED | |
| 19. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions) a. <input checked="" type="checkbox"/> Exhibit A. Origin and Breeding History of the Variety b. <input checked="" type="checkbox"/> Exhibit B. Statement of Distinctness c. <input checked="" type="checkbox"/> Exhibit C. Objective Description of Variety d. <input type="checkbox"/> Exhibit D. Additional Description of the Variety (Optional) e. <input checked="" type="checkbox"/> Exhibit E. Statement of the Basis of the Owner's Ownership f. <input checked="" type="checkbox"/> Filing and Examination Fee (\$4,382), ✓ Make checks and money orders payable to "Treasurer of the United States" (Mail to the Plant Variety Protection Office) ✓ Credit Card Payments (See instructions on Page 2 of 10) | | 21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? <input type="checkbox"/> YES <input type="checkbox"/> NO IF YES, WHICH CLASSES? <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED | |
| 23. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. (Please use space indicated on reverse.) | | 22. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input type="checkbox"/> YES <input type="checkbox"/> NO IF YES, SPECIFY THE NUMBER 1,2,3, etc. FOR EACH CLASS. ____ FOUNDATION ____ REGISTERED ____ CERTIFIED (If additional explanation is necessary, please use the space indicated on the reverse.) | |
| 24. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT (PLANT BREEDER'S RIGHT OR PATENT)? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. (Please use space indicated on reverse.) | | 25. The owners declare that a viable sample of basic seed will be furnished directly to an acceptable depository in support of the variety within three months of filing. Seed will be replenished upon request in accordance with such regulations as may be applicable. For a tuber propagated variety or vegetative propagated parent of the variety, a tissue culture or vegetative sample will be deposited in a public repository within three months of the date of the certificate fee request letter. These will be maintained for the duration of the certificate. The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act. Owner(s) is (are) informed that false representation herein can jeopardize protection and result in penalties. | |
| SIGNATURE OF OWNER Benjamin B. Drake | | SIGNATURE OF OWNER | |
| NAME (Please print or type) Benjamin B. Drake | | NAME (Please print or type) | |
| CAPACITY OR TITLE Senior Research Associate | | CAPACITY OR TITLE | |
| DATE 03/19/2015 | | DATE | |

22. CONTINUED FROM FRONT *(Please provide a statement as to the limitation and sequence of generations that may be certified.)*

23. CONTINUED FROM FRONT *(Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)*

24. CONTINUED FROM FRONT *(Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)*

U.S. Patent Application date: February 17, 2015 - Serial No. 14/623629

| | | |
|--|---|---|
| U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE EXHIBIT A – ORIGIN AND BREEDING HISTORY <small>** Use additional pages as needed.</small> | | FOR OFFICIAL USE ONLY <hr/> PVPO NUMBER 201500229 |
| 1. Name of Owner Pioneer Hi-Bred International, Inc. | 2. Temporary Designation or Experimental Name | 3. Variety Name PH1MJ9 |
| 4. Describe the genealogy (back to and including public and commercial varieties, lines, or clones used) and the breeding method(s). ** <p>Pioneer variety PH1MJ9, an inbred of yellow corn (<i>Zea mays L.</i>), was developed by Pioneer Hi-Bred International, Inc. from a cross made in 2005 in Moorhead, MN between PHPNN (PVP Certificate No. 200800241) and PHEHG (PVP Certificate No. 200500258) using the pedigree method of plant breeding. Varieties PHPNN and PHEHG are proprietary inbred lines of Pioneer Hi-Bred International, Inc.</p> <p>During line development, crosses were made to inbred testers for the purpose of estimating hybrid combining ability. Yield trials were grown at Moorhead, Minnesota and other Pioneer research locations.</p> | | |
| 5. Give the details of subsequent stages of selection and multiplication. ** | | |
| Year | Detail of Stage | Selection Criteria |
| 2005 | The initial cross PHPNN x PHEHG was made. | The criteria used were yield per se and yield in hybrid combination. Late season plant health, grain quality, and stalk lodging resistance were important criteria considered during selection. Other selection criteria include: ability to germinate in adverse conditions, disease and insect resistance, pollen production and tassel size. |
| 2005 | F1 was planted, self-pollinated and harvested in bulk. | |
| 2006 | F2 population was self-pollinated and ears were selected. | |
| 2007 | F3 families were self-pollinated and ears were selected. | |
| 2008 | F4 line was self-pollinated and ears were selected. | |
| 2008 | F5 line was self-pollinated and ears were selected. | |
| 2009 | F6 line was self-pollinated and ears were selected. | |
| 2010 | F7 line was self-pollinated and ears were selected. | |
| 2010 | F8 line was self-pollinated and ears were selected. | |
| 2011 | F9 line was self-pollinated and harvested in bulk. | |
| 6. Is the variety uniform? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No How did you test for uniformity? Field trials were grown and observed for uniformity and stability over 4 generations, with one or more environments in each generation. Genetic purity testing was used in the purification process. | | |
| 7. Is the variety stable? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No How did you test for stability? Over how many generations? Field trials were grown and observed for uniformity and stability over 4 generations, with one or more environments in each generation. | | |
| 8. Are genetic variants observed or expected during reproduction and multiplication? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, state how these variants may be identified, their type and frequency. | | |

| U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE EXHIBIT B – STATEMENT OF DISTINCTNESS ** Use additional tables to present clear differences for additional comparison varieties. Use additional pages to present supporting evidence. | | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="text-align: center; font-size: small;">FOR OFFICIAL USE ONLY</th> </tr> <tr> <td style="text-align: center; font-size: small;">PVPO NUMBER</td> </tr> <tr> <td style="text-align: center; font-size: large;">201500229</td> </tr> </table> | FOR OFFICIAL USE ONLY | PVPO NUMBER | 201500229 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|---|--|--|--|--|--|--|--|-------------------------------|-------------------------|--------------------------------|-------------------------|---------------------|----------------------------------|---|--|--|----------------------|-------------------------------|---|--|--|----------------------|--|--|--|--|----------------------|--|--|--|--|
| FOR OFFICIAL USE ONLY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PVPO NUMBER | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 201500229 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Name of Owner Pioneer Hi-Bred International, Inc. | 2. Temporary Designation or Experimental Name | 3. Variety Name PH1MJ9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Based on overall morphology, <u>PH1MJ9</u> is most similar to <u>PHPNN</u> . <u>PH1MJ9</u> most clearly differs from <u>PHPNN</u> in the following traits. Name the specific trait, then list the value of that trait for each variety in the comparison. <i>Applicant's new variety</i> <i>Most similar comparison variety(ies)</i> <i>Applicant's new variety</i> <i>Most similar comparison variety(ies)</i> Submit appropriate supporting evidence (see the Guidelines for Presenting Evidence in Support of Variety Distinctness in the instructions): | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 5%;"></th> <th style="width: 25%; font-size: small;"> <i>Eg. Leaf Pubescence</i> <i>Eg. Leaf Color</i> <i>Eg. Plant Height</i> </th> <th style="width: 25%; font-size: small;"> <i>heavy pubescence</i> <i>Dark Green (5GY 3/4)</i> <i>200 cm +/- 10 cm (N=25)</i> </th> <th style="width: 25%; font-size: small;"> <i>glabrous</i> <i>Light Green (2.5GY 8/10)</i> <i>250 cm +/- 15 cm (N=25)</i> </th> <th style="width: 20%; font-size: small;"> <i>photograph attached</i> <i>Munsell Color Chart</i> <i>statistics attached</i> </th> </tr> <tr> <td></td> <td>1. Qualitative traits:</td> <td>2. Color traits:</td> <td>3. Quantitative traits:</td> <td>4. Other traits:</td> </tr> <tr> <td style="writing-mode: vertical-rl; transform: rotate(180deg); text-align: center;">Application Variety</td> <td>brace root anthocyanin: Moderate</td> <td> anther color: Light Red (Munsell: 2.5R4/8) dry husk color: Buff (Munsell: 2.5Y8/4) silk color: Light Red (Munsell: 10RP5/8) </td> <td> cob diameter (mm): 24.26 ± 1.21 (N=40) leaf to stalk angle (deg.): 25.73 ± 3.95 (N=40) leaf width (cm): 7.1 ± 0.58 (N=40) plant height (cm): 204.65 ± 6.89 (N=40) </td> <td></td> </tr> <tr> <td style="writing-mode: vertical-rl; transform: rotate(180deg); text-align: center;">Comparison Variety 1</td> <td>brace root anthocyanin: Faint</td> <td> anther color: Purple (Munsell: 10RP2/6) dry husk color: White (Munsell: 2.5Y9/2) silk color: Red (Munsell: 10RP3/8) </td> <td> cob diameter (mm): 20.96 ± 1.12 (N=40) leaf to stalk angle (deg.): 35.03 ± 4.22 (N=40) leaf width (cm): 8.38 ± 0.59 (N=40) plant height (cm): 222 ± 6.12 (N=40) </td> <td></td> </tr> <tr> <td style="writing-mode: vertical-rl; transform: rotate(180deg); text-align: center;">Comparison Variety 2</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="writing-mode: vertical-rl; transform: rotate(180deg); text-align: center;">Comparison Variety 3</td> <td></td> <td></td> <td></td> <td></td> </tr> </table> | | | | | <i>Eg. Leaf Pubescence</i> <i>Eg. Leaf Color</i> <i>Eg. Plant Height</i> | <i>heavy pubescence</i> <i>Dark Green (5GY 3/4)</i> <i>200 cm +/- 10 cm (N=25)</i> | <i>glabrous</i> <i>Light Green (2.5GY 8/10)</i> <i>250 cm +/- 15 cm (N=25)</i> | <i>photograph attached</i> <i>Munsell Color Chart</i> <i>statistics attached</i> | | 1. Qualitative traits: | 2. Color traits: | 3. Quantitative traits: | 4. Other traits: | Application Variety | brace root anthocyanin: Moderate | anther color: Light Red (Munsell: 2.5R4/8) dry husk color: Buff (Munsell: 2.5Y8/4) silk color: Light Red (Munsell: 10RP5/8) | cob diameter (mm): 24.26 ± 1.21 (N=40) leaf to stalk angle (deg.): 25.73 ± 3.95 (N=40) leaf width (cm): 7.1 ± 0.58 (N=40) plant height (cm): 204.65 ± 6.89 (N=40) | | Comparison Variety 1 | brace root anthocyanin: Faint | anther color: Purple (Munsell: 10RP2/6) dry husk color: White (Munsell: 2.5Y9/2) silk color: Red (Munsell: 10RP3/8) | cob diameter (mm): 20.96 ± 1.12 (N=40) leaf to stalk angle (deg.): 35.03 ± 4.22 (N=40) leaf width (cm): 8.38 ± 0.59 (N=40) plant height (cm): 222 ± 6.12 (N=40) | | Comparison Variety 2 | | | | | Comparison Variety 3 | | | | |
| | <i>Eg. Leaf Pubescence</i> <i>Eg. Leaf Color</i> <i>Eg. Plant Height</i> | <i>heavy pubescence</i> <i>Dark Green (5GY 3/4)</i> <i>200 cm +/- 10 cm (N=25)</i> | <i>glabrous</i> <i>Light Green (2.5GY 8/10)</i> <i>250 cm +/- 15 cm (N=25)</i> | <i>photograph attached</i> <i>Munsell Color Chart</i> <i>statistics attached</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1. Qualitative traits: | 2. Color traits: | 3. Quantitative traits: | 4. Other traits: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Application Variety | brace root anthocyanin: Moderate | anther color: Light Red (Munsell: 2.5R4/8) dry husk color: Buff (Munsell: 2.5Y8/4) silk color: Light Red (Munsell: 10RP5/8) | cob diameter (mm): 24.26 ± 1.21 (N=40) leaf to stalk angle (deg.): 25.73 ± 3.95 (N=40) leaf width (cm): 7.1 ± 0.58 (N=40) plant height (cm): 204.65 ± 6.89 (N=40) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Comparison Variety 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Comparison Variety 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**** Use additional tables to present clear differences for additional comparison varieties. Use additional pages to present supporting evidence.**

Supporting Data for Exhibit B

Table 1: Data supporting differences between PH1MJ9 and PHPNN. The varieties were grown in two locations having different planting dates and growing environments. A two-sample t-test was used to compare differences between means.

cob diameter (mm)

| Year | Location | VARIETY-1 | n | Mean | Stdev | VARIETY-2 | n | Mean | Stdev | Diff | SEdiff | t-value | prob |
|------|----------|-----------|----|------|-------|-----------|----|------|-------|------|--------|---------|-------|
| 2013 | MHNN009N | PH1MJ9 | 20 | 24.5 | 1.50 | PHPNN | 20 | 21.2 | 1.10 | 3.3 | 0.92 | 8.01 | 0.000 |
| 2013 | WLBINB4 | PH1MJ9 | 20 | 24.0 | 0.82 | PHPNN | 20 | 20.8 | 1.13 | 3.3 | 0.89 | 10.48 | 0.000 |

leaf to stalk angle (deg.)

| Year | Location | VARIETY-1 | n | Mean | Stdev | VARIETY-2 | n | Mean | Stdev | Diff | SEdiff | t-value | prob |
|------|----------|-----------|----|------|-------|-----------|----|------|-------|-------|--------|---------|-------|
| 2013 | MHNN009N | PH1MJ9 | 20 | 24.9 | 5.18 | PHPNN | 20 | 36.9 | 4.44 | -12.1 | 1.04 | -7.90 | 0.000 |
| 2013 | WLBINB4 | PH1MJ9 | 20 | 26.6 | 2.09 | PHPNN | 20 | 33.1 | 3.99 | -6.6 | 1.00 | -6.50 | 0.000 |

leaf width (cm)

| Year | Location | VARIETY-1 | n | Mean | Stdev | VARIETY-2 | n | Mean | Stdev | Diff | SEdiff | t-value | prob |
|------|----------|-----------|----|------|-------|-----------|----|------|-------|------|--------|---------|-------|
| 2013 | MHNN009N | PH1MJ9 | 20 | 6.8 | 0.64 | PHPNN | 20 | 8.2 | 0.67 | -1.4 | 0.85 | -6.76 | 0.000 |
| 2013 | WLBINB4 | PH1MJ9 | 20 | 7.5 | 0.51 | PHPNN | 20 | 8.6 | 0.50 | -1.1 | 0.83 | -7.18 | 0.000 |

plant height (cm)

| Year | Location | VARIETY-1 | n | Mean | Stdev | VARIETY-2 | n | Mean | Stdev | Diff | SEdiff | t-value | prob |
|------|----------|-----------|----|-------|-------|-----------|----|-------|-------|-------|--------|---------|-------|
| 2013 | MHNN009N | PH1MJ9 | 20 | 216.8 | 7.79 | PHPNN | 20 | 232.9 | 7.14 | -16.1 | 1.09 | -6.83 | 0.000 |
| 2013 | WLBINB4 | PH1MJ9 | 20 | 192.6 | 5.85 | PHPNN | 20 | 211.1 | 4.90 | -18.6 | 1.05 | -10.87 | 0.000 |

REPRODUCE LOCALLY. Include form number and date on all reproductions.

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**U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MD 20705**

Exhibit C

**OBJECTIVE DESCRIPTION OF VARIETY
Corn (*Zea mays* L.)**

| | | |
|---|--|--|
| NAME OF APPLICANT (S) Pioneer Hi-Bred International, Inc. | TEMPORARY OR EXPERIMENTAL DESIGNATION | VARIETY NAME PH1MJ9 |
| ADDRESS (Street and No., or RD No., City, State, Zip Code, and Country) 7301 NW 62nd Avenue Johnston Iowa 50131-0085 USA | | FOR OFFICIAL USE ONLY 201500229 |

In the spaces on the left, enter the appropriate numbers that describe the characteristics of the application variety. On the right, enter the appropriate numbers that describe the characteristics of the most similar comparison variety. Right justify whole numbers by adding leading zeros if necessary. The variety that you choose for comparison should be the most similar one in terms of overall morphology, background and maturity. The comparison variety should be grown in field trials **with** the application variety for 2-3 location/years (environments) in the region and season of best adaptability. At least one year of trials should be conducted within the United States of America. In general, measurements of quantitative traits should be taken **from one trial on 15-25 randomly selected plants or plant parts** to obtain averages and statistics that describe a typical field of the variety. (Form technical content last updated Dec. 1992.)

COLOR CHOICES (Use in conjunction with Munsell color code to describe all color choices: describe #25 and #26 in Comments section):

| | | | | |
|----------------------|--------------------|------------------|-------------------|----------------------------|
| 01 = Light Green | 06 = Pale Yellow | 11 = Pink | 16 = Pale Purple | 21 = Buff |
| 02 = Medium Green | 07 = Yellow | 12 = Light Red | 17 = Purple | 22 = Tan |
| 03 = Dark Green | 08 = Yellow-Orange | 13 = Cherry Red | 18 = Colorless | 23 = Brown |
| 04 = Very Dark Green | 09 = Salmon | 14 = Red | 19 = White | 24 = Bronze |
| 05 = Green-Yellow | 10 = Pink-Orange | 15 = Red & White | 20 = White Capped | 25 = Variegated (Describe) |
| | | | | 26 = Other (Describe) |

STANDARD INBRED CHOICES (Use the **most similar** (in background and maturity) of these to make comparisons based on **grow-out trial data**):

| | | |
|------------------------------|---------------------------------|-----------------------------|
| Yellow Dent Families: | Yellow Dent (Unrelated): | Sweet Corn: |
| Family Members | Co109, ND246 | C13, Iowa5125, P39, 2132 |
| B14 CM105, A632, B64, B68 | Oh7, T232 | |
| B37 B37, B76, H84 | W117, W153R | Popcorn: |
| B73 N192, A679, B73, NC268 | W182BN | SG1533, 4722, HP301, HP7211 |
| C103 Mo17, Va102, Va35, A682 | | |
| Oh43 A619, MS71, H99, Va26 | White Dent: | Pipecorn: |
| Wf9 W64A, A554, A654, Pa91 | Cl66, H105, Ky228 | Mo15W, Mo16W, Mo24W |

| | |
|---|---|
| 1. TYPE: (Describe intermediate types in Comments section) <u>2</u> 1 = Sweet 2 = Dent 3 = Flint 4 = Flour 5 = Pop 6 = Ornamental 7 = Pipecorn 8 = Other (specify) _____ | Most Similar Variety Name: <u>PHPNN</u> <u>2</u> Type |
| 2. REGION WHERE DEVELOPED IN THE U.S.A.: <u>2</u> 1 = Northwest 2 = North central 3 = Northeast 4 = Southeast 5 = South central 6 = Southwest 7 = Other _____ | Seed Source: _____ <u>2</u> Region Where Developed |
| Application Variety Data | Most Similar Variety Data |

| Application Variety Data | | | | Most Similar Variety Data | | | |
|---|---|---|-------------|---------------------------|-----------------------------|--------------------|-------------|
| 3. MATURITY (In Region Best Adaptability: show Heat Unit Formula in Comments section): | | | | | | | |
| DAYS | HEAT UNITS | | | DAYS | HEAT UNITS | | |
| <u>53</u> | <u>1060.0</u> | From emergence to 50% of plants in silk | | <u>54</u> | <u>1062.0</u> | 50% Silk | |
| <u>53</u> | <u>1060.0</u> | From emergence to 50% of plants in pollen | | <u>54</u> | <u>1062.0</u> | 50% Pollen | |
| <u>7</u> | <u>98.0</u> | From 10% to 90% pollen shed | | <u>6</u> | <u>83.0</u> | Pollen Shed Period | |
| <u> </u> | <u> </u> | From 50% silk to optimum edible quality | | <u> </u> | <u> </u> | 50% Edible | |
| <u> </u> | <u> </u> | From 50% silk to harvest at 25% moisture | | <u> </u> | <u> </u> | Dry Down Period | |
| 4. PLANT: | | | | Mean | | | |
| | | Standard Deviation | Sample Size | | | Standard Deviation | Sample Size |
| <u>192.6</u> | cm Plant Height (to tassel tip) | <u>5.85</u> | <u>20</u> | <u>211.1</u> | cm Plant Height | <u>4.90</u> | <u>20</u> |
| <u>90.2</u> | cm Ear Height (to base of top ear node) | <u>8.03</u> | <u>20</u> | <u>94.8</u> | cm Ear Height | <u>6.51</u> | <u>20</u> |
| <u>12.2</u> | cm Length of Top Ear Internode | <u>0.88</u> | <u>20</u> | <u>15.2</u> | cm Internode | <u>0.88</u> | <u>20</u> |
| <u>0.0</u> | Average Number of Tillers | <u>0.00</u> | <u>20</u> | <u>0.0</u> | No. Tillers | <u>0.00</u> | <u>20</u> |
| <u>1.1</u> | Average Number of Ears per Stalk | <u>0.22</u> | <u>20</u> | <u>1.1</u> | No. Ears/Stalk | <u>0.37</u> | <u>20</u> |
| <u>3</u> | Anthocyanin of Brace Roots: 1 = Absent 2 = Faint 3 = Moderate 4 = Dark | | | <u>2</u> | Brace Root Anthocyanin | | |
| 5. LEAF: | | | | Mean | | | |
| | | Standard Deviation | Sample Size | | | Standard Deviation | Sample Size |
| <u>7.5</u> | cm Width of Ear Node Leaf | <u>0.51</u> | <u>20</u> | <u>8.6</u> | cm Leaf Width | <u>0.50</u> | <u>20</u> |
| <u>73.2</u> | cm Length of Ear Node Leaf | <u>1.85</u> | <u>20</u> | <u>77.3</u> | cm Leaf Length | <u>2.15</u> | <u>20</u> |
| <u>4.6</u> | Number of leaves above top ear | <u>0.60</u> | <u>20</u> | <u>3.9</u> | No. Top Leaves | <u>0.31</u> | <u>20</u> |
| <u>26.6</u> | degrees Leaf Angle (measure from 2nd leaf above ear at anthesis to stalk above leaf) | <u>2.09</u> | <u>20</u> | <u>33.1</u> | Leaf Angle | <u>3.99</u> | <u>20</u> |
| <u>4</u> | Leaf Color (Munsell Code) | <u>7.5GY3/4</u> | | <u>4</u> | Leaf Color (Munsell Code) | <u>5GY3/4</u> | |
| <u>8</u> | Leaf Sheath Pubescence (Rate on scale from 1 = none to 9 = like peach fuzz) | | | <u>7</u> | Leaf Sheath Pubescence | | |
| <u> </u> | Marginal Waves (Rate on scale from 1 = none to 9 = many) | | | <u> </u> | Marginal Waves | | |
| <u> </u> | Longitudinal Creases (Rate on scale from 1 = none to 9 = many) | | | <u> </u> | Longitudinal Creases | | |
| 6. TASSEL: | | | | Mean | | | |
| | | Standard Deviation | Sample Size | | | Standard Deviation | Sample Size |
| <u>6.6</u> | Number of Primary Lateral Branches | <u>2.30</u> | <u>20</u> | <u>5.0</u> | No. Tassel Branches | <u>1.08</u> | <u>20</u> |
| <u>36.1</u> | Branch Angle from Central Spike | <u>8.44</u> | <u>20</u> | <u>22.8</u> | Branch Angle | <u>4.87</u> | <u>20</u> |
| <u>39.4</u> | cm Tassel Length (From top leaf collar to tassel tip) | <u>3.22</u> | <u>20</u> | <u>41.1</u> | cm Tassel Length | <u>4.13</u> | <u>20</u> |
| <u>7</u> | Pollen Shed (Rate on Scale from 0 = male sterile to 9 = heavy shed) | | | <u>8</u> | Pollen Shed Rate | | |
| <u>12</u> | Anther Color (Munsell Code) | <u>2.5R4/8</u> | | <u>17</u> | Anther Color (Munsell Code) | <u>10RP2/6</u> | |
| <u>1</u> | Glume Color (Munsell Code) | <u>5GY7/6</u> | | <u>1</u> | Glume Color (Munsell Code) | <u>5GY7/6</u> | |
| <u>1</u> | Bar Glumes (Glume Bands): 1 = Absent 2 = Present | | | <u>1</u> | Bar Glumes | | |
| Application Variety Data | | | | Most Similar Variety Data | | | |

| Application Variety Data | | | | Most Similar Variety Data | | | |
|-----------------------------------|--|--------------------|-------------|---------------------------|---|--------------------|-------------|
| 7a. EAR (Unhusked Data): | | | | | | | |
| <u>12</u> | Silk Color (3 days after emergence) (Munsell code) | <u>10RP5/8</u> | | <u>14</u> | Silk Color (Munsell code) | <u>10RP3/8</u> | |
| <u>2</u> | Fresh Husk Color (25 days after 50% silking) (Munsell code) | <u>5GY6/8</u> | | <u>2</u> | Fresh Husk Color (Munsell code) | <u>5GY6/8</u> | |
| <u>21</u> | Dry Husk Color (65 days after 50% silking) (Munsell code) | <u>2.5Y8/4</u> | | <u>19</u> | Dry Husk Color (Munsell code) | <u>2.5Y9/2</u> | |
| <u>1</u> | Position of Ear at Dry Husk Stage: 1 = Upright 2 = Horizontal 3 = Pendent | | | <u>1</u> | Ear Position | | |
| <u>4</u> | Husk Tightness (Rate on scale from 1 = very loose to 9 = very tight) | | | <u>5</u> | Husk Tightness | | |
| <u>2</u> | Husk Extension (at harvest): 1 = Short (ears exposed) 2 = Medium (<8 cm) 3 = Long (8-10 cm beyond ear tip) 4 = Very Long (>10 cm) | | | <u>2</u> | Husk Extension | | |
| 7b. EAR (Husked Ear Data): | | | | Mean | | | |
| | | Standard Deviation | Sample Size | | | Standard Deviation | Sample Size |
| <u>13.8</u> | cm Ear Length | <u>0.61</u> | <u>20</u> | <u>13.3</u> | cm Ear Length | <u>0.73</u> | <u>20</u> |
| <u>40.8</u> | mm Ear Diameter at mid-point | <u>1.52</u> | <u>20</u> | <u>37.3</u> | mm Ear Diameter | <u>1.18</u> | <u>20</u> |
| <u>107.7</u> | gm Ear Weight | <u>9.48</u> | <u>20</u> | <u>88.4</u> | gm Ear Weight | <u>8.82</u> | <u>20</u> |
| <u>15.1</u> | Number of Kernel Rows | <u>1.21</u> | <u>20</u> | <u>12.6</u> | No. Kernel Rows | <u>0.94</u> | <u>20</u> |
| <u>2</u> | Kernel Rows: 1 = Indistinct 2 = Distinct | | | <u>2</u> | Kernel Rows | | |
| <u>1</u> | Row Alignment: 1 = Straight 2 = Slightly Curved 3 = Spiral | | | <u>1</u> | Row Alignment | | |
| <u>8.1</u> | cm Shank Length | <u>1.88</u> | <u>20</u> | <u>13.9</u> | cm Shank Length | <u>2.64</u> | <u>20</u> |
| <u>2</u> | Ear Taper: 1 = Slight 2 = Average 3 = Extreme | | | <u>2</u> | Ear Taper | | |
| 8. KERNEL (Dried): | | | | Mean | | | |
| | | Standard Deviation | Sample Size | | | Standard Deviation | Sample Size |
| <u>10.4</u> | mm Kernel Length | <u>0.43</u> | <u>20</u> | <u>10.1</u> | mm Kernel Length | <u>0.53</u> | <u>20</u> |
| <u>8.3</u> | mm Kernel Width | <u>0.42</u> | <u>20</u> | <u>8.7</u> | mm Kernel Width | <u>0.61</u> | <u>20</u> |
| <u>4.5</u> | mm Kernel Thickness | <u>0.24</u> | <u>20</u> | <u>4.5</u> | mm Kernel Thickness | <u>0.31</u> | <u>20</u> |
| | % Round Kernels (Shape Grade) | | | | % Round Kernels | | |
| <u>1</u> | Aleurone Color Pattern: 1=Homozygous 2=Segregating (Describe) _____ | | | <u>1</u> | Aleurone Color Pattern (Describe) _____ | | |
| <u>7</u> | Aleurone Color (Munsell code) | <u>10YR7/12</u> | | <u>7</u> | Aleurone Color (Munsell code) | <u>10YR7/14</u> | |
| <u>7</u> | Hard Endosperm Color (Munsell code) | <u>10YR7/12</u> | | <u>7</u> | Endosperm Color (Munsell code) | <u>10YR7/12</u> | |
| <u>3</u> | Endosperm Type: 1 = Sweet (su1) 2 = Extra Sweet (sh2) 3 = Normal Starch 4 = High Amylose Starch 5 = Waxy Starch 6 = High Protein 7 = High Lysine 8 = Super Sweet (se) 9 = High Oil 10 = Other _____ | | | <u>3</u> | Endosperm Type _____ | | |
| | gm Weight per 100 Kernels (unsized sample) | | | | gm Kernel Wt. | | |
| 9. COB: | | | | Mean | | | |
| | | Standard Deviation | Sample Size | | | Standard Deviation | Sample Size |
| <u>24.0</u> | mm Cob Diameter at mid-point | <u>0.82</u> | <u>20</u> | <u>20.8</u> | mm Cob Diameter | <u>1.13</u> | <u>20</u> |
| <u>14</u> | Cob Color (Munsell code) | <u>10R2/6</u> | | <u>14</u> | Cob Color (Munsell code) | <u>10R3/8</u> | |
| Application Variety Data | | | | Most Similar Variety Data | | | |

| Application Variety Data | Most Similar Variety Data |
|---|--|
| 10. DISEASE RESISTANCE (Rate from 1 (most susceptible) to 9 (most resistant); leave blank if not tested; leave Race or Strain Options blank if polygenic): | |
| A. Leaf Blights, Wilts, and Local Infection Diseases | |
| <input type="checkbox"/> Anthracnose Leaf Blight (<i>Colletotrichum graminicola</i>) <input type="checkbox"/> Common Rust (<i>Puccinia sorghi</i>) <input type="checkbox"/> Common Smut (<i>Ustilago maydis</i>) <input type="checkbox"/> Eyespot (<i>Kabatiella zeae</i>) <input type="checkbox"/> Goss's Wilt (<i>Clavibacter michiganense</i> spp. <i>nebraskense</i>) <input type="checkbox"/> Gray Leaf Spot (<i>Cercospora zeae-maydis</i>) <input type="checkbox"/> Helminthosporium Leaf Spot (<i>Bipolaris zeicola</i>) Race _____ <input type="checkbox"/> Northern Leaf Blight (<i>Exserohilum turcicum</i>) Race _____ <input type="checkbox"/> Southern Leaf Blight (<i>Bipolaris maydis</i>) Race _____ <input type="checkbox"/> Southern Rust (<i>Puccinia polysora</i>) <input type="checkbox"/> Stewart's Wilt (<i>Erwinia stewartii</i>) <input type="checkbox"/> Other (Specify) _____ | <input type="checkbox"/> Anthracnose Leaf Blight <input type="checkbox"/> Common Rust <input type="checkbox"/> Common Smut <input type="checkbox"/> Eyespot <input type="checkbox"/> Goss's Wilt <input type="checkbox"/> Gray Leaf Spot <input type="checkbox"/> Helminthosporium Leaf Spot Race _____ <input type="checkbox"/> Northern Leaf Blight Race _____ <input type="checkbox"/> Southern Leaf Blight Race _____ <input type="checkbox"/> Southern Rust <input type="checkbox"/> Stewart's Wilt <input type="checkbox"/> Other (Specify) _____ |
| B. Systemic Diseases | |
| <input type="checkbox"/> Corn Lethal Necrosis (MCMV and MDMV) <input type="checkbox"/> Head Smut (<i>Sphacelotheca reiliana</i>) <input type="checkbox"/> Maize Chlorotic Dwarf Virus (MCDV) <input type="checkbox"/> Maize Chlorotic Mottle Virus (MCMV) <input type="checkbox"/> Maize Dwarf Mosaic Virus (MDMV) Strain _____ <input type="checkbox"/> Sorghum Downy Mildew of Corn (<i>Peronosclerospora sorghi</i>) <input type="checkbox"/> Other (Specify) _____ | <input type="checkbox"/> Corn Lethal Necrosis <input type="checkbox"/> Head Smut <input type="checkbox"/> Maize Chlorotic Dwarf Virus <input type="checkbox"/> Maize Chlorotic Mottle Virus <input type="checkbox"/> Maize Dwarf Mosaic Virus Strain _____ <input type="checkbox"/> Sorghum Downy Mildew of Corn <input type="checkbox"/> Other (Specify) _____ |
| C. Stalk Rots | |
| <input type="checkbox"/> Anthracnose Stalk Rot (<i>Colletotrichum graminicola</i>) <input type="checkbox"/> Diplodia Stalk Rot (<i>Stenocarpella maydis</i>) <input type="checkbox"/> Fusarium Stalk Rot (<i>Fusarium moniliforme</i>) <input type="checkbox"/> Gibberella Stalk Rot (<i>Gibberella zeae</i>) <input type="checkbox"/> Other (Specify) _____ | <input type="checkbox"/> Anthracnose Stalk Rot <input type="checkbox"/> Diplodia Stalk Rot <input type="checkbox"/> Fusarium Stalk Rot <input type="checkbox"/> Gibberella Stalk Rot <input type="checkbox"/> Other (Specify) _____ |
| D. Ear and Kernel Rots | |
| <input type="checkbox"/> Aspergillus Ear and Kernel Rot (<i>Aspergillus flavus</i>) <input type="checkbox"/> Diplodia Ear Rot (<i>Stenocarpella maydis</i>) <input type="checkbox"/> Fusarium Ear and Kernel Rot (<i>Fusarium moniliforme</i>) <input type="checkbox"/> Gibberella Ear Rot (<i>Gibberella zeae</i>) <input type="checkbox"/> Other (Specify) _____ | <input type="checkbox"/> Aspergillus Ear and Kernel Rot <input type="checkbox"/> Diplodia Ear Rot <input type="checkbox"/> Fusarium Ear and Kernel Rot <input type="checkbox"/> Gibberella Ear Rot <input type="checkbox"/> Other (Specify) _____ |
| 11. INSECT RESISTANCE (Rate from 1 (most susceptible) to 9 (most resistant) Leave blank if not tested): | |
| <div style="text-align: right;">Standard Deviation Sample Size</div> <input type="checkbox"/> Banks Grass Mite (<i>Oligonychus pratensis</i>) Corn Earworm (<i>Helicoverpa zea</i>) <input type="checkbox"/> Leaf-Feeding <input type="checkbox"/> Silk Feeding: _____ mg larval wt. _____ <input type="checkbox"/> Ear Damage <input type="checkbox"/> Corn Leaf Aphid (<i>Rhopalosiphum maidis</i>) <input type="checkbox"/> Corn Sap Beetle (<i>Carpophilus dimidiatus</i>) European Corn Borer (<i>Ostrinia nubilalis</i>) <input type="checkbox"/> 1st Generation (Typically Whorl Leaf Feeding) <input type="checkbox"/> 2nd Generation (Typically Leaf Sheath-Collar Feeding) Stalk Tunneling: <input type="checkbox"/> _____ cm tunneled/plant _____ Fall Armyworm (<i>Spodoptera frugiperda</i>) <input type="checkbox"/> Leaf-Feeding <input type="checkbox"/> Silk Feeding: _____ mg larval wt. _____ | <div style="text-align: right;">Standard Deviation Sample Size</div> <input type="checkbox"/> Banks Grass Mite Corn Earworm <input type="checkbox"/> Leaf-Feeding <input type="checkbox"/> Silk Feeding: _____ <input type="checkbox"/> Ear Damage <input type="checkbox"/> Corn Leaf Aphid <input type="checkbox"/> Corn Sap Beetle European Corn Borer <input type="checkbox"/> 1st Generation <input type="checkbox"/> 2nd Generation Stalk Tunneling: <input type="checkbox"/> _____ cm tunneled/plant _____ Fall Armyworm <input type="checkbox"/> Leaf-Feeding <input type="checkbox"/> Silk Feeding: _____ mg larval wt. _____ |
| Application Variety Data | Most Similar Variety Data |

| Application Variety Data | Most Similar Variety Data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|--------------------|--|--|---------------------------------------|---------------------------------------|---|-----------------------------------|--|---|---|-------------|--|--|--|--------------------|--|--|--|--|--|--|--|--|--|--|--|-----------------------------|--|--|--|--|--------------------|-------------|--------------------|--|--|-------------------------|--|--|-------------------------|--|--|-------------------------|--|--|--------------------|--|--|-----------------------------|--|--|-------------------------------|--|--|------------------------|--|--|-----------------------------|--|--|
| 11. INSECT RESISTANCE (continued): <table border="0"> <tr> <td></td> <td>Standard Deviation</td> <td>Sample Size</td> </tr> <tr> <td>_____ Maize Weevil (<i>Sitophilus zeamaze</i>)</td> <td></td> <td></td> </tr> <tr> <td>_____ Northern Rootworm (<i>Diabrotica barberi</i>)</td> <td></td> <td></td> </tr> <tr> <td>_____ Southern Rootworm (<i>Diabrotica undecimpunctata</i>)</td> <td></td> <td></td> </tr> <tr> <td colspan="3">Southwestern Corn Borer (<i>Diatraea grandiosella</i>)</td> </tr> <tr> <td>_____ Leaf-Feeding</td> <td></td> <td></td> </tr> <tr> <td>_____ Stalk Tunneling: _____ cm tunneled/plant _____</td> <td></td> <td></td> </tr> <tr> <td>_____ Two-spotted Spider Mite (<i>Tetranychus urticae</i>)</td> <td></td> <td></td> </tr> <tr> <td>_____ Western Rootworm (<i>Diabrotica virgifera virgifera</i>)</td> <td></td> <td></td> </tr> <tr> <td>_____ Other (Specify) _____</td> <td></td> <td></td> </tr> </table> | | Standard Deviation | Sample Size | _____ Maize Weevil (<i>Sitophilus zeamaze</i>) | | | _____ Northern Rootworm (<i>Diabrotica barberi</i>) | | | _____ Southern Rootworm (<i>Diabrotica undecimpunctata</i>) | | | Southwestern Corn Borer (<i>Diatraea grandiosella</i>) | | | _____ Leaf-Feeding | | | _____ Stalk Tunneling: _____ cm tunneled/plant _____ | | | _____ Two-spotted Spider Mite (<i>Tetranychus urticae</i>) | | | _____ Western Rootworm (<i>Diabrotica virgifera virgifera</i>) | | | _____ Other (Specify) _____ | | | <table border="0"> <tr> <td></td> <td>Standard Deviation</td> <td>Sample Size</td> </tr> <tr> <td>_____ Maize Weevil</td> <td></td> <td></td> </tr> <tr> <td>_____ Northern Rootworm</td> <td></td> <td></td> </tr> <tr> <td>_____ Southern Rootworm</td> <td></td> <td></td> </tr> <tr> <td colspan="3">Southwestern Corn Borer</td> </tr> <tr> <td>_____ Leaf-Feeding</td> <td></td> <td></td> </tr> <tr> <td>_____ Stalk Tunneling _____</td> <td></td> <td></td> </tr> <tr> <td>_____ Two-spotted Spider Mite</td> <td></td> <td></td> </tr> <tr> <td>_____ Western Rootworm</td> <td></td> <td></td> </tr> <tr> <td>_____ Other (Specify) _____</td> <td></td> <td></td> </tr> </table> | | Standard Deviation | Sample Size | _____ Maize Weevil | | | _____ Northern Rootworm | | | _____ Southern Rootworm | | | Southwestern Corn Borer | | | _____ Leaf-Feeding | | | _____ Stalk Tunneling _____ | | | _____ Two-spotted Spider Mite | | | _____ Western Rootworm | | | _____ Other (Specify) _____ | | |
| | Standard Deviation | Sample Size | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ Maize Weevil (<i>Sitophilus zeamaze</i>) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ Northern Rootworm (<i>Diabrotica barberi</i>) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ Southern Rootworm (<i>Diabrotica undecimpunctata</i>) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Southwestern Corn Borer (<i>Diatraea grandiosella</i>) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ Leaf-Feeding | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ Stalk Tunneling: _____ cm tunneled/plant _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ Two-spotted Spider Mite (<i>Tetranychus urticae</i>) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ Western Rootworm (<i>Diabrotica virgifera virgifera</i>) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ Other (Specify) _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Standard Deviation | Sample Size | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ Maize Weevil | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ Northern Rootworm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ Southern Rootworm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Southwestern Corn Borer | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ Leaf-Feeding | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ Stalk Tunneling _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ Two-spotted Spider Mite | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ Western Rootworm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ Other (Specify) _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12. AGRONOMIC TRAITS: <table border="0"> <tr> <td>_____ Stay Green (at 65 days after anthesis) (Rate on a scale of 1 = worst to 9 = excellent)</td> <td>_____ Stay Green</td> </tr> <tr> <td>_____ % Dropped Ears (at 65 days after anthesis)</td> <td>_____ % Dropped ears</td> </tr> <tr> <td>_____ % Pre-anthesis Brittle Snapping</td> <td>_____ % Pre-anthesis Brittle Snapping</td> </tr> <tr> <td>_____ % Pre-anthesis Root Lodging</td> <td>_____ % Pre-anthesis Root Lodging</td> </tr> <tr> <td>_____ % Post-anthesis Root Lodging (at 65 days after anthesis)</td> <td>_____ % Post-anthesis Root Lodging</td> </tr> <tr> <td>_____ Kg/ha Yield of Inbred Per Se (at 12-13% grain moisture)</td> <td>_____ Yield</td> </tr> </table> | _____ Stay Green (at 65 days after anthesis) (Rate on a scale of 1 = worst to 9 = excellent) | _____ Stay Green | _____ % Dropped Ears (at 65 days after anthesis) | _____ % Dropped ears | _____ % Pre-anthesis Brittle Snapping | _____ % Pre-anthesis Brittle Snapping | _____ % Pre-anthesis Root Lodging | _____ % Pre-anthesis Root Lodging | _____ % Post-anthesis Root Lodging (at 65 days after anthesis) | _____ % Post-anthesis Root Lodging | _____ Kg/ha Yield of Inbred Per Se (at 12-13% grain moisture) | _____ Yield | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ Stay Green (at 65 days after anthesis) (Rate on a scale of 1 = worst to 9 = excellent) | _____ Stay Green | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ % Dropped Ears (at 65 days after anthesis) | _____ % Dropped ears | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ % Pre-anthesis Brittle Snapping | _____ % Pre-anthesis Brittle Snapping | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ % Pre-anthesis Root Lodging | _____ % Pre-anthesis Root Lodging | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ % Post-anthesis Root Lodging (at 65 days after anthesis) | _____ % Post-anthesis Root Lodging | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ Kg/ha Yield of Inbred Per Se (at 12-13% grain moisture) | _____ Yield | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

13. MOLECULAR MARKERS: (0 = data unavailable; 1 = data available but not supplied; 2 = data supplied)

_____ Isozymes _____ RFLP's _____ RAPD's 1 Other (Specify) _____ SNPs

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COMMENTS: (e.g., state how heat units were calculated, standard inbred seed source, and/or where data was collected. Continue in Exhibit D.)

Insect, disease, brittle snapping, yield and root lodging data are collected mainly from environments where variability for the trait can be obtained within the experiment.

CLARIFICATION OF DATA IN EXHIBITS B AND C

Please note the data presented in Exhibit B and C, "Objective Description of Variety," are collected primarily at Moorhead and/or Willmar, Minnesota. The quantitative data in Table 1 are from two sample t-tests using data collected in the locations or environments shown. Qualitative trait data are presented from environments where the data best represents the variety(ies). The traits in Exhibit B collectively show distinct differences between the two varieties.

For the given year of data collection, our experimental design was set up so entries with similar maturities were planted near each other with one replication of the new variety grown in each environmental location. The experiment procedures generally involve two or three locations/environments with different planting dates, planted in 17.42 ft., 4 row plots for each variety. Approximately 24-30 plants emerged in each of the 4 rows for a total of around 96 to 120 plants being evaluated in each environment and 192 to 360 plants across locations or environments. For plant level traits, we sampled up to 20 representative plants from the middle 2 rows of the 4 row plot (group) of plants in each location/environment. For plot level traits we evaluated the 4 row plot (group) and gave a representative score or average on the 96-120 plants in the group within an experiment.

| Month | GROWING DEGREE UNITS (GDUs) | | PRECIPITATION (Inches) | |
|--------------|-----------------------------|-------------|------------------------|--------------|
| | 2013 | | 2013 | |
| | Moorhead, MN | Willmar, MN | Moorhead, MN | Willmar, MN |
| May | 318 | 266 | 2.73 | 3.29 |
| June | 516 | 504 | 7.68 | 4.76 |
| July | 620 | 661 | 1.51 | 2.04 |
| August | 586 | 612 | 1.41 | 2.55 |
| September | 424 | 448 | 5.32 | 2.84 |
| TOTAL | 2464 | 2491 | 18.65 | 15.48 |

Growing Degree Units use following formula: $GDU = ((T1+T2)/2)-50$

Where T1 = minimum temperature for a given day with 50 degrees Fahrenheit as the minimum temperature used and 86 degrees Fahrenheit is the maximum temperature used.

Where T2 = maximum temperature for a given day with 86 degrees Fahrenheit as the maximum temperature used and 50 degrees Fahrenheit is the minimum temperature used.

GDUs are calculated each day and accumulated (summed) over certain number of days.

U.S. DEPARTMENT OF AGRICULTURE
 AGRICULTURAL MARKETING SERVICE
 SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE
 APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

FOR OFFICIAL USE ONLY

PVPO NUMBER

201500229

EXHIBIT E - STATEMENT OF THE BASIS OF OWNERSHIP

1. Name of Owner

Pioneer Hi-Bred International, Inc.

2. Temporary Designation or Experimental Name

3. Variety Name

PH1MJ94. Does the applicant own all rights to the variety? Mark an "X" in the appropriate block. **If no, please explain.**☒ YES☐ NO5. Is the applicant a U.S. national or a U.S. based entity? **If no, give name of country.**☒ YES☐ NO

6. Is the applicant the original owner?

☒ YES☐ NO**If no, please answer one of the following:**

a. If the original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. National(s)?

☐ YES☐ NO**If no, give name of country:** _____

b. If the original rights to variety were owned by a company(ies), is (are) the original owner(s) a U.S. based company?

☐ YES☐ NO**If no, give name of country:** _____7. Additional explanation on ownership (*Trace ownership from original breeder to current owner. Use the reverse for extra space if needed*):

Pioneer Hi-Bred International, Inc. (PHI), Des Moines, Iowa, and/or its wholly owned subsidiary Pioneer Overseas Corporation (POC), Des Moines, Iowa, is the employer of the plant breeders involved in the selection and development of PH1MJ9. Pioneer Hi-Bred International and/or Pioneer Overseas Corporation has the sole rights and ownership of PH1MJ9 pursuant to written contracts that assign all rights in the variety to PHI and/or POC at the time such variety was created. No rights to this variety are retained by any individuals.

PLEASE NOTE:

Plant variety protection can only be afforded to the owners (not licensees) who meet the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.
2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.
3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed the final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definitions.